Earth Science

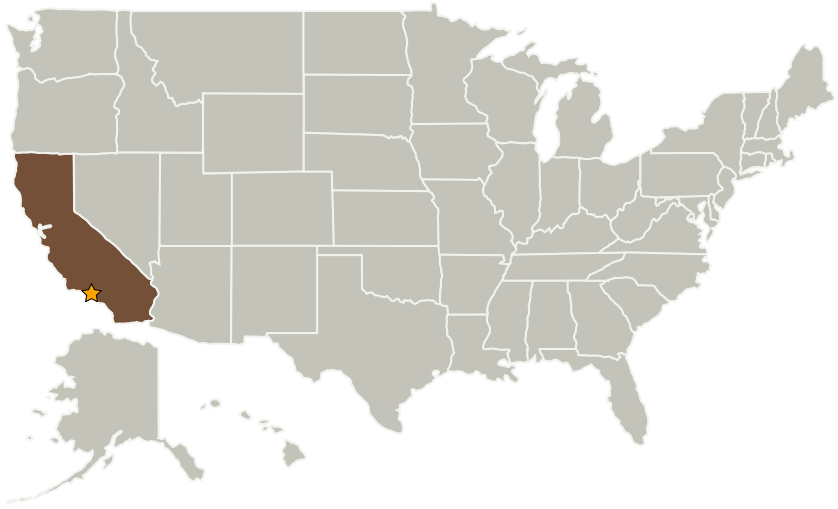
Advanced W-Band Gallium Nitride Monolithic Microwave Integrated Circuits (MMICs) for Doppler Cloud Radar Supporting ACE

Completed Technology Project (2012 - 2015)

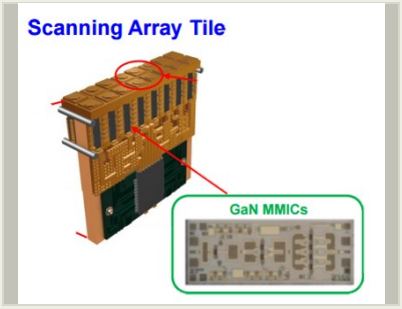
Project Introduction

The Aerosol/Cloud/Ecosystem (ACE) Decadal Survey Mission, and the Cloud and Precipitation Processes Mission (CaPPM) can benefit from new 94 GHz array scanning radar capability. New W-band GaN amplifiers that have been development under ESTO ACT can enable the most compact electronically steerable transceiver arrays for cloud Doppler radar, which can significantly increase new science data retrieval rates. InW-band (75-110 GHz) GaN amplifiers are presently the highest RF output power density (>1 Watt per MMIC) with high efficiency (~20%) semiconductor technology available. We have designed, fabricated and now characterizing new GaN PAs, driver amplifiers and low noise amplifiers for the 3-band Doppler radar instrument concept (Sadowy IIP13) targeting ACE and CaPPM requirements. Future developments in GaN amplifiers will enable higher frequency radar arrays capable of characterizing even smaller particles beyond 110 GHz.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Raytheon Company	Supporting Organization	Industry	



Image

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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

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Primary U.S. Work Locations

California

Images

Advanced W-Band Gallium Nitride Monolithic Microwave Integrated Circuits (MMICs) for Doppler Cloud Radar Supporting ACE Project
Image
(https://techport.nasa.gov/image/20851)

Project Management

Program Director:

George J Komar

Principal Investigator:

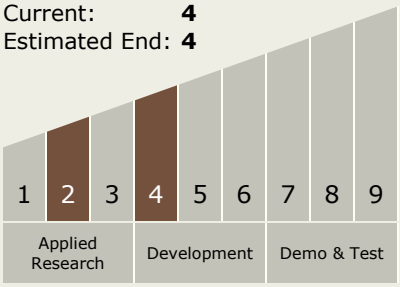
King Man Fung

Co-Investigators:

Lorene A Samoska
Simone Tanelli
Gregory A Sadowy
Pekka P Kangaslahti

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

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Target Destination

Earth